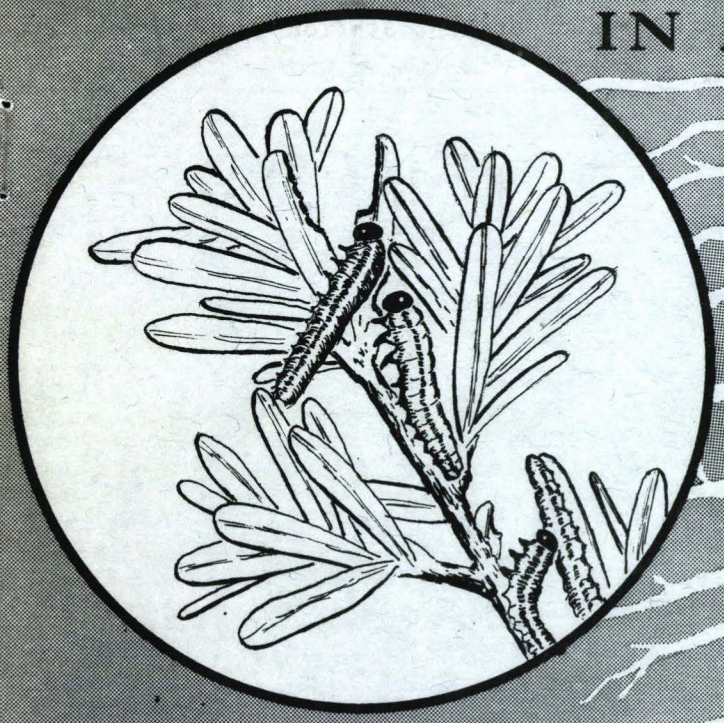
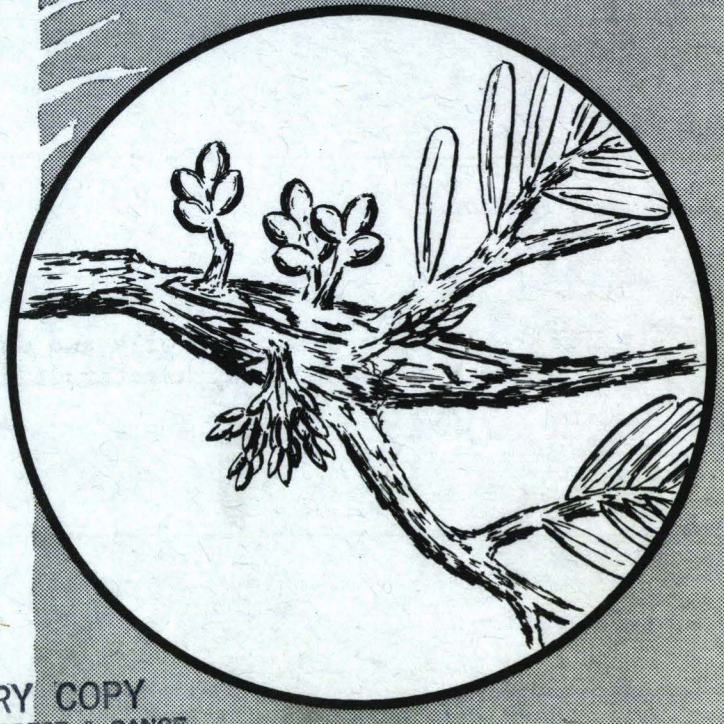
SB761
A3A4
1966

Forest Insect & Disease Conditions

IN ALASKA DURING 1966





U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
ALASKA REGION
OCTOBER, 1966

LIBRARY COPY
ROCKY MT. FOREST & RANGE
EXPERIMENT STATION

DIVISION OF TIMBER MANAGEMENT

The purpose of this report is to inform forest managers in Alaska of the status of forest insects and diseases during 1966 and to provide a record of such conditions. The information represents the contributions of numerous field observers from the U.S. Forest Service, the Department of Interior and the State of Alaska. The entomological and pathological advice of the Northern Forest Experiment Station is particularly appreciated.

COVER: Both the hemlock sawfly and dwarfmistletoe are damaging agents on western hemlock in Southeastern Alaska.

FOREST INSECT AND DISEASE CONDITIONS IN ALASKA DURING 1966

by

David Crosby

and

Bruce H. Baker

October 1966

Division of Timber Management
Region 10
Forest Service
U.S. Department of Agriculture
Juneau, Alaska

CONTENTS

Subject	Page
CONDITIONS IN BRIEF	i
STATUS OF INSECTS	
DEFOLIATORS	
Black-headed budworm	1
Hemlock sawfly	1
Aspen leaf tier	6
Western hemlock looper	6
BARK BEETLES	
Alaska spruce beetle	8
Ambrosia beetles	9
Cedar bark beetle	9
OTHER INSECTS	
Cottonwood leaf beetle	10
Cone moths	10
Insects affecting regenerated stands	10
DISEASES	
Western dwarfmistletoe	10
A rust fungus	10

CONDITIONS IN BRIEF

Hemlock sawfly populations in Southeastern Alaska showed evidence of an overall increase while the black-headed budworm remained at a low level for the second consecutive season. Defoliation was noticeable only in areas of heavy sawfly feeding. In Interior Alaska, the black-headed budworm was recorded on white spruce as far north as Circle. The acreage of defoliation caused by a western hemlock looper population on the Bradfield River drainage did not increase markedly. Timber killed by this insect is included in a recently awarded timber sale. A leaf tier on aspen and birch caused extensive leaf skeletonizing in the Fairbanks area.

Ambrosia beetles infested Sitka spruce and western hemlock logs felled in Southeastern Alaska. Prevention and control involved prompt utilization. The Alaska spruce beetle caused patches of white spruce and Sitka spruce mortality on the Kenai Peninsula. Control plans are anticipated in areas of high resource value.

Dwarfmistletoe and a spruce needle rust continue to attack trees in Southeastern Alaska.

STATUS OF INSECTS

DEFOLIATORS

Black-headed budworm, Acleris variana (Fern.)
Tortricidae: Lepidoptera

Although many areas have a recent history of black-headed budworm outbreaks, larval collections from 70 areas on the Tongass National Forest indicated extremely low black-headed budworm populations. This is likely a carryover from the 1965 population reduction which has been attributed to early instar mortality resulting from abnormally hot weather. The total number of budworms decreased from a 1965 low of 189 per three-tree sample to a 1966 low of 36 (Table 1). No visible defoliation on the Tongass National Forest was attributed to the insect this year.

In Alaska's Interior, the black-headed budworm was collected from white spruce along most of the principal highways (Figure 1). Collections were made on the Kenai Peninsula along the Sterling Highway, north to Anchorage, and on to Fairbanks along the Glenn and Richardson Highways. Budworms were also collected as far north as Livengood and Circle. Larvae were discovered along the Tanana River near Northway Junction. While no epidemic budworm populations were detected in the Interior, larvae were relatively abundant along the Richardson Highway from Mile 19½ west of Valdez to Mile 60, along the Copper Highway four miles and six miles east of the Cordova airport, and at the Cabin Lake Campground near Cordova.

Hemlock sawfly, Neodiprion tsugae Midd.
Diprionidae: Hymenoptera

Based on larval collections made in 1966 (Figure 2), high hemlock sawfly populations were noted on Chichagof Island in Freshwater Bay (Kennel Creek), Pavlof Harbor, Crab Bay, and Sitkoh Bay. High populations were also recorded on Baranof Island in Saook Bay and Rodman Bay. High larval counts were noted on Admiralty Island in Gambier Bay and Eliza Harbor. Similarly high counts were recorded in Calder Bay, on Orr Island, Thorne Island, Stevenson Island, Tolstoi Point, and near Kasaan. Despite high larval counts in these areas, the resulting defoliation was obvious only in areas of heavy sawfly feeding. Additional high populations were discovered near Kake and Irish Creek on Kupreanof Island and on Kuiu Island near Rocky Pass. In these cases, medium to heavy defoliation was detected during an aerial detection survey.

The total number of sawflies collected increased from 2,518 in 1965 to 5,186 in 1966, suggesting a general increase in the hemlock sawfly in Southeastern Alaska (Table 1).

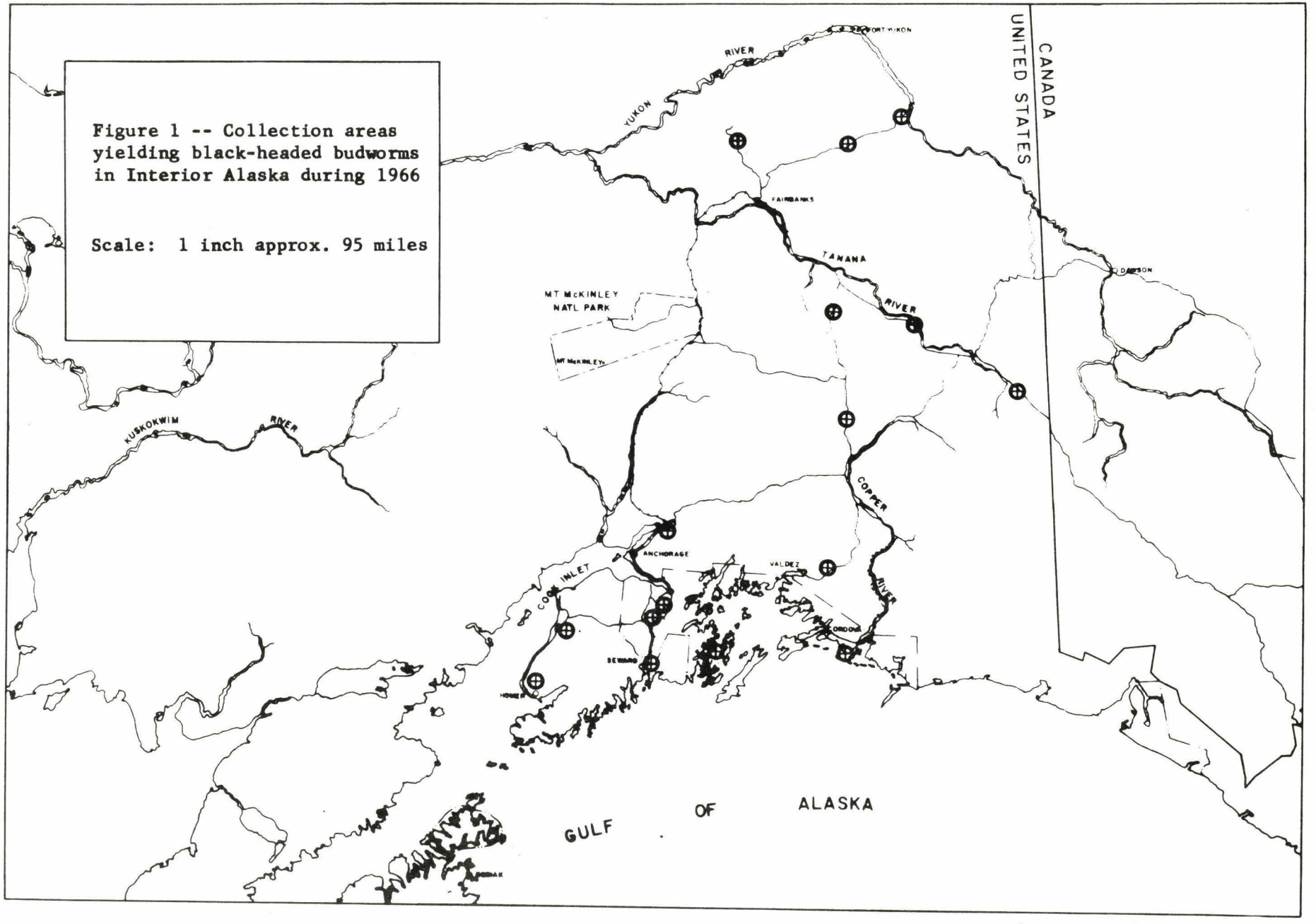


Figure 1 -- Collection areas yielding black-headed budworms in Interior Alaska during 1966
Scale: 1 inch approx. 95 miles
YUKON RIVER
FORT YUKON
CANADA
UNITED STATES
FAIRBANKS
TANANA RIVER
DAWSON
MT McKINLEY NATL PARK
KUSKOKWIM RIVER
COPPER RIVER
ANCHORAGE
COOK INLET
VALDEZ
SEWARD
GULF OF ALASKA

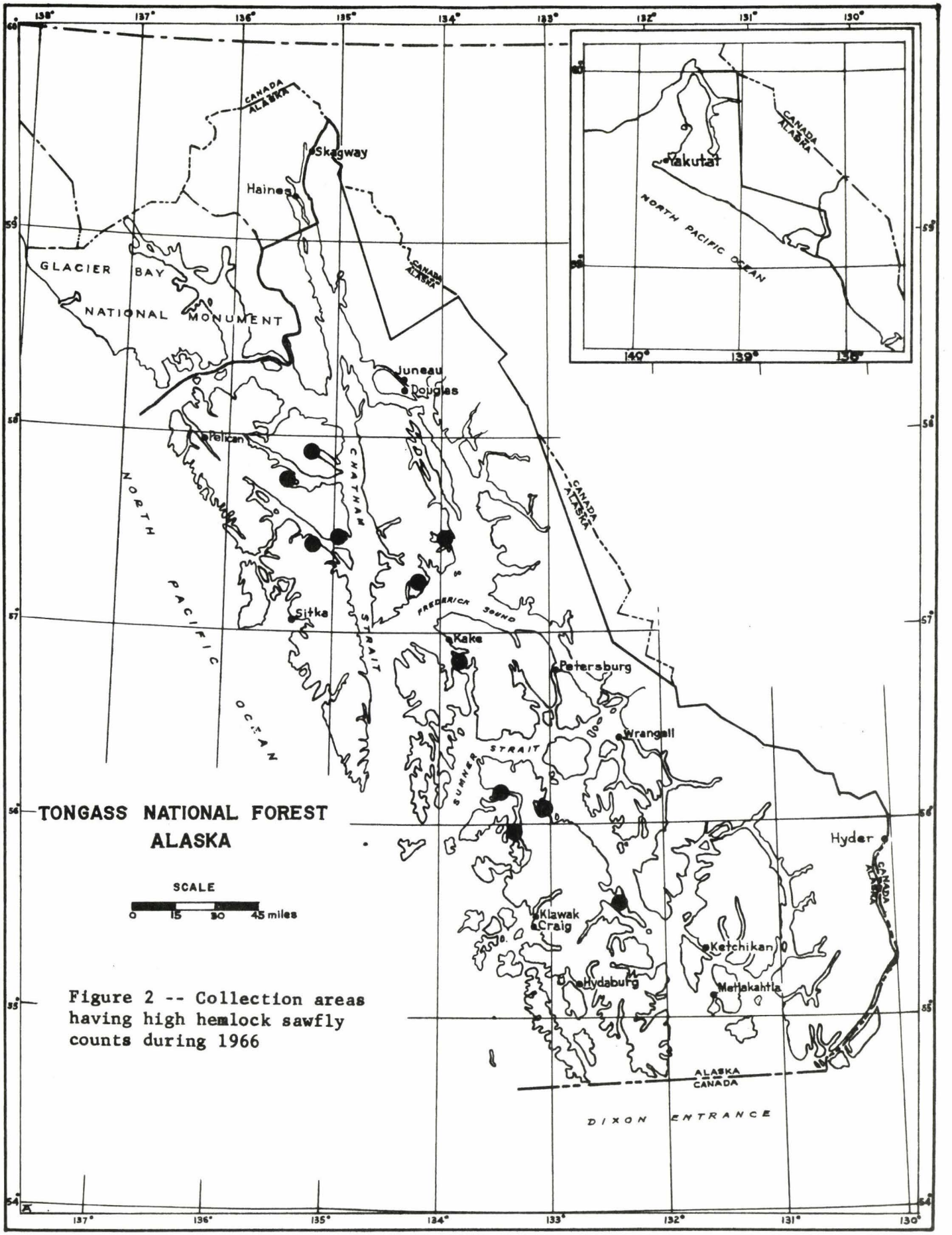


Figure 2 -- Collection areas having high hemlock sawfly counts during 1966

Table 1 -- Black-headed budworm and hemlock sawfly larval collections on the Tongass National Forest during 1965 and 1966

Location	1965		1966	
	Budworms	Sawflies	Budworms	Sawflies
Kosciusko Is. (Shakan)	1	0	20	54
Prince of Wales Is.				
Port Protection	0	0	0	0
Calder Bay	8	94	1	500+
Tuxekan	0	0	2	16
Deweyville	30	10	0	40
Red Bay	40	0	0	71
Coffman Cove	0	2	0	7
Ratz Harbor	0	173	2	32
Tolstoi Point	0	59	0	108
Thorne Bay	0	17	0	3
Kasaan	0	15	0	97
Hollis	0	0	0	25
Twelvemile Arm	0	1	0	0
Saltery Cove	0	0	0	2
McKenzie Inlet	0	0	0	77
Cabin Creek	0	0	0	0
Polk Inlet	0	0	0	0
Cholmondeley Sound-West Arm	0	117	0	0
Cholmondeley Sound-South Arm	0	3	0	2
Vicinity of Prince of Wales Is.				
Orr Island	0	0	5	350
Tuxekan Island	0	0	2	54
Thorne Island	0	6	0	500+
Stevenson Island	1	89	0	130
Revillagigedo Island				
Thorne Arm-opposite Snipe Is.	0	0	0	0
Moth Bay	0	0	0	0
Princess Bay	0	0	0	15
Portage Cove	0	0	1	0
Behm Canal-Mainland				
Hut Point	0	22	0	0
Fish Point	0	0	0	1
Saks Cove	0	0	0	1
Yes Bay	0	6	1	30
Spacious Bay	0	0	0	0
Neets Bay	1	0	0	4
Naha Bay	0	1	0	0
Helm Bay	0	6	0	1

Location	1965 Budworms	1965 Sawflies	1966 Budworms	1966 Sawflies
Vicinity of Ernest Sound				
Vixen Inlet	0	0	0	6
Santa Anna Inlet	0	2	0	7
Bradfield Canal				
Martin Creek	0	0	0	1
Anan Creek	0	0	0	0
Harding River	0	0	0	2
Eagle River	0	0	0	0
Kupreanof Island				
Duncan Canal	0	0	0	19
Kah Sheets Bay	0	0	0	17
Baranof Island				
Saook Bay	2	70	0	110
Rodman Bay	1	110	0	500+
Fish Bay	0	2	2	1
Katlian Bay	15	0	0	0
Chichagof Island				
Sitkoh Bay	1	650	0	500+
Ushk Bay	14	67	0	74
Freshwater Bay	27	180	0	500+
Pavlof Harbor	0	34	0	86
Crab Bay	13	640	0	500+
Trap Bay	2	45	0	17
Seal Bay	0	7	0	0
Neka Bay	0	24	0	39
Spasski Bay	0	7	0	0
Admiralty Island				
Gambier Bay	8	40	0	489
Pybus Bay-West Channel	0	0	0	0
Eliza Harbor	13	0	0	171
Tyee	1	0	0	7
Barlow Cove	0	0	0	2
Funter Bay	5	0	0	0
Hawk Inlet	0	13	0	6
Young Bay	0	0	0	0
Lynn Canal				
Sullivan Island	3	0	0	0
Endicott River	3	0	0	0
William Henry Bay	0	0	0	0
St. James Bay	0	6	0	12
Pt. Howard	0	0	0	0
Total Collected	189	2,518	36	5,186+

On the Kenai Peninsula, hemlock sawflies were collected north of Knik Arm and at Miles 44 and 62 on the Sterling Highway northwest of Seward. No outbreaks were found in the Interior.

Leaf tier on aspen and birch

A leaf tier identified as Choristoneura conflictana caused considerable defoliation in Interior Alaska. Heavy defoliation of aspen and birch was recorded between Miles 1399 and 1401 along the Alaska Highway. Farther north, 640 acres of defoliation occurred between Miles 292 and 294 of the Richardson Highway.

An estimated 1,500 to 2,000 acres of defoliation occurred in the Fairbanks area on the Farmer's Loop, Miles 9 and 11 along the Elliot Highway, and along the Steese Highway between Miles 13 and 37, 44 and 47, and 54 and 55. Non-contiguous areas of defoliation were observed between Bonanza Creek and Delta Junction and northward toward the Yukon River as far as the aspen type extends.

Western hemlock looper, Lambdina fiscellaria lugubrosa Hulst
Geometridae: Lepidoptera

The western hemlock looper infestation discovered on the Bradfield River southeast of Wrangell in 1965 persisted again this year. A survey revealed that the actual defoliated area totaled 400 acres in 1965. Insect feeding in 1966 resulted in only 30 acres of additional defoliation. The favored host in the Bradfield drainage is Sitka spruce, with western hemlock being fed upon only when the favored food source becomes scarce. Spruce which were heavily defoliated in 1965 show current mortality. The entire infestation is within a recently awarded timber sale.

The infestation is divided into nine individual areas distributed over both forks of the Bradfield River (Table 2).

Table 2 -- Acres defoliated by the western hemlock looper on the Bradfield River during 1965 and 1966

	1965	1966	Total
East Fork			
Area 1	15.1	0	15.1
2	7.5	3.1	10.6
3	12.8	10.4	23.2
4	75.2	10.0	85.2
5	9.4	0	9.4
Total	120.0	23.5	143.5

Table 2 (Contd)

	1965	1966	Total
North Fork			
Area 1	15.1	0	15.1
2	72.1	3.1	75.2
3	45.1	1.9	47.0
4	144.2	5.0	149.2
Total	276.5	10.0	286.5
Grand Total	396.5	33.5	430.0

Exploratory observations were made by the Section of Insect and Disease Control in coordination with the Northern Forest Experiment Station. During May 1966, an egg survey was conducted in which 6" by 6" (¼ sq. ft.) moss samples were collected at breast height from the boles of dominant or codominant Sitka spruce. The trees were selected at 10-chain intervals on a line passing through the center of the somewhat elongate defoliated areas extending along the river valley. A review of the literature indicates that the egg distributions from the lower tree boles are usually highly variable. Breast height samples are, however, easily obtained and provide some indication of the looper's status in an area. As expected, higher egg counts were accompanied by greater increases in defoliation (Table 3).

Table 3 -- Comparison of acreage defoliated with mean number of hemlock looper eggs. Bradfield River, 1966.

Mean no. of eggs per 1965 parent infestation area	Increase in defoliated acres in 1966
5.7	1.9
6.0	3.1
8.0	5.0
15.8	10.0
23.7	10.4

As the western hemlock looper had not been recorded in Alaska prior to 1965, special attention was given to nearby mainland drainages during the 1966 aerial insect survey of Southeastern Alaska. Weather conditions permitted the survey crew or Forest Service Ranger District personnel to investigate most such drainages in the southern portion of the Tongass National Forest. No other looper defoliation was observed on the Forest. A suspected area was observed near the Alaska-British Columbia border on the Canadian side. This was reported to the Canada Department of Forestry. Correspondence with the latter did not reveal any other recent western hemlock looper activity along the border.

On the Bradfield River, 1966 defoliation was first apparent on the tips of Sitka spruce foliage on July 16. Branch tips were gray to brownish and the amount of defoliation on currently infested trees was 25%-30%. Prior to the above date, larvae were abundant in the area centers. As 1965 feeding removed most of the available spruce food supply in the area centers, larvae resorted to the suppressed hemlock and broad-leaved understory vegetation. Such larvae became scarce after mid-July. Insects then became quite apparent in area edges where green Sitka spruce became defoliated. The remaining collections showed larvae in the area edges to be generally of greater size and vigor.

By July 26, the tops of suppressed hemlock in the area centers were completely defoliated and the lower branches were defoliated 30%-40%.

By August 8, edge spruce trees were displaying light (0-30%) to medium (30%-60%) tree defoliation. The abundance of larvae is summarized in the following table:

Table 4 -- Relative abundance of western hemlock looper larvae in lower crowns and on forest floor. Bradfield River, 1966.

Location within infestation area	Month		
	June	July	August
Center	Abundant	Declined	Scarce
Edge	Moderate to scarce	Moderate	Abundant

On July 30 and August 1, Insect and Disease personnel assisted research entomologists in collecting 6,000 3rd, 4th and 5th instar larvae for shipment to the Forest Service Insecticides Testing Laboratory at Berkeley, California. A report from that office revealed the presence of a polyhedral virus in the looper population.

BARK BEETLES

Alaska spruce beetle, Dendroctonus obesus (Mann.)
Scolytidae: Coleoptera

This beetle has been reported to have caused tree mortality in localized patches on the Chugach National Forest on the west shore of Kenai Lake, at the junction of the Russian and Kenai Rivers, in the Jerome Lake vicinity on the Sterling Highway, and in the Anchor Point area. Considerable new tree mortality was observed on a 200-acre area near the mouth of the Chickaloon River. The use of trap trees was discussed with District Rangers on the Chugach and plans are being made for practice of this control technique on a small scale.

Ambrosia beetles
Scolytidae: Coleoptera

Beetles have been found infesting felled Sitka spruce and western hemlock logs at Gustavus and on Prince of Wales Island at Cape Pole and Port Alice. The magnitude of beetle damage is as follows:

Area	Volume felled (M bd. ft.) Fall 1965	Spring 1966
Gustavus	350	---
Cape Pole	2,000	11,000
Port Alice	3,000	15,000

Logs felled in the Fall of 1965 contained an average of 20-40 entrance holes per square foot and tunnels penetrating about three inches into the sapwood.

Recommended control was the utilization or water storage of all late summer or fall felled timber before the spring flight of beetles.

Cedar bark beetle, Phloeosinus squamosus Blkm.
Scolytidae: Coleoptera

The cedar bark beetle has been found in dead western red cedar occurring on the perimeters of muskegs and on some well drained sites. It is not known just what role the beetle plays in such tree mortality. Egg galleries are not usually numerous enough to indicate that the insect is the causative agent.

Dead western red cedar was readily detected from the air during August 29-31. Small patches, usually not more than three acres in extent, were recorded in Southeastern Alaska from Pearse Canal and Fillmore Island north to Boca de Quadra, Revillagigedo Island between Princess Bay and Thorne Arm, Cleveland Peninsula between Helm Bay and Vixen Inlet, Wrangell Island and Etolin Island along Zimovia Strait, Kupreanof Island on the east shore of Lindenberg Peninsula, Lindenberg Peninsula and Mitkof Island along Wrangell Narrows from Petersburg to exit in Sumner Strait, and the muskeg region across Lindenberg Peninsula between Wrangell Narrows and Duncan Canal. Cedar mortality was also recorded between Wrangell Narrows and Blind Slough on Mitkof Island and on the south shore of Kupreanof Island from Kah Sheets Bay to Point Barrie.

Dead cedar was noted on Kuiu Island at the following locations: Bay of Pillars, Rowan Bay, Rocky Pass to Elena Bay including Three Mile Arm, Alvin Bay, Reid Bay, Port Beauclerc, Louise Cove, Point St. Albans, Affleck Canal and Petrof Bay.

Isolated patches were found on the west shore of Duncan Canal on Kupreanof Island extending from Towers Arm to Castle River. A few patches were detected along Blake Channel and Bradfield Canal.

OTHER INSECTS

Cottonwood leaf beetle, Chrysomela scripta F.
Chrysomelidae: Coleoptera

Larvae of this beetle were reported causing leaf skeletonizing of black cottonwood at various locations in Southeastern Alaska. Some tree discoloration was present in the Mendenhall Valley.

Cone moths

Damage to Sitka spruce cones by moths in the genus Laspeyresia was quite apparent in Thomas Bay, Thorne Bay, Traitors Cove, Burrough's Bay, Unuk River and Tongass Island. The overall effect on the spruce seed crop has not been investigated.

Insects affecting regenerated stands, Southeastern Alaska

During May and June of 1966, research and survey entomologists conducted a 20-day survey of cutover areas in Southeastern Alaska to determine the incidence of regeneration insect problems. In examining Sitka spruce and western hemlock stands from five to forty years of age, no problem insects were discovered. Although a special effort was made to discover the Sitka spruce weevil, Pissodes sitchensis Hopk., no specimens were found. In October, adult weevils, Steremnius carinatus (Boheman), were collected in Ketchikan. The specimens apparently emerged from firewood, but the species is reportedly capable of causing damage to coniferous seedlings.

DISEASES

Western dwarfmistletoe, Arceuthobium campylopodum Engelm. f. tsugensis Gill

Recent and old dwarfmistletoe infections have been evaluated at Rookery Island, Level Island, Mitkof Island, Rodman Bay on Baranof Island and in Ketchikan. Repeated dwarfmistletoe infections have resulted in growth loss and tree defect. Where infected trees have been allowed to remain standing in clearcuts, the potential for infection of the new reproduction has been high. Although dwarfmistletoe spreads slowly, infection appears to intensify rapidly enough that farily light infections in young stands can become damaging by the end of the rotation. Merchantable volume at rotation age may be reduced an estimated minimum of 15%, and possibly more, if the stand is infected at an early age. For these reasons, dwarfmistletoe control in Region 10 shall consist of felling unmerchantable remnants of logged-over stands which have exhibited a history of dwarfmistletoe infection.

A rust fungus, Chrysomyxa ledicola Lagerh.

Needle browning of Sitka spruce growing on poor sites has been noticed at scattered points on Prince of Wales Island and in the

Mendenhall Valley. The fungus requires Labrador tea as an alternate host. It causes tree mortality only when occurring several years in succession, as it attacks only the current year's foliage.